## ABSTRACT OF THE DISCLOSURE

Polynucleotides having allosteric properties that modify a function or configuration of the polynucleotide with a chemical effector and/or physical signal are employed primarily as biosensors and/or enzymes for diagnostic and catalytic purposes. In some preferred embodiments, the polynucleotides are DNA enzymes that are used in solution/suspension or attached to a solid support as biosensors to detect the presence or absence of a compound, its concentration, or physical change in a sample by observation of self-catalysis. Chemical effectors include organic compounds such as amino acids, amino acid derivatives, peptides, nucleosides, nucleotides, steroids, and mixtures of these with each other and with metal ions, cellular metabolites or blood components obtained from biological samples, steroids, pharmaceuticals, pesticides, herbicides, food toxins, and the like. Physical signals include radiation, temperature changes, and combinations thereof.